

## REMARKS

Claims 1-3 and 6-14 are now in the application. Claim 1 has been amended to recite that the “reinforcing filler is at least one member selected from the group consisting of carbon black and silica.” Basis for this amendment to claim 1 can be found on page 6, lines 2-4 of the specification. Claim 1 has been amended by deleting the term “in the molecule”, by inserting the term “and present”, and by relocating “(i)” as suggested by the Examiner and for the purpose of clarification and not to limit its scope. Claims 1, 7, 8, 9 and 11 have been amended to recite “growing terminal anions formed by anionic polymerization” in place of “the growing terminal anions formed by an anion polymerization” as suggested by the Examiner and for the purpose of clarification and not to limit their scope. The dependency of claim 6 has been amended to claim 1 since claim 5 has been cancelled for the purpose of clarification and not to limit its scope. The amendments to the claims do not introduce any new matter.

The objections to claims 1, 6-9 and 11 have been overcome by amendments to the claims.

Claims 1, 2, 7, 9, 10 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,270,394 to Hoxmeier in view of U.S. Patent 3,923,722 to Lakshmanan. The cited references do not render obvious Claims 1, 2, 7, 9, 10 and 11.

As is clear from the above amended claims, the essence of the present invention resides in the use of the modified conjugated diene-based polymer, together with a rubber component and a reinforcing filler in the rubber composition. The modified conjugated diene-based polymer is synthesized by reacting growing terminal anions formed by anionic polymerization of the conjugated diene-based polymer with a fullerene. The amount of the fullerene bonded to the terminal end of the modified conjugated diene-based polymer is 0.001 to 2 molecules per one molecular chain of the modified conjugated diene-based polymer. The filler is at least one member selected from the group of carbon black and silica.

As a result, the rubber composition, which is suitable for use, for example, as a rubber for a tire tread, exhibits excellent processability, superior balance between the modulus and the heat buildup, excellent cold flowability and superior  $\tan \delta$  balance, e.g., a low  $\tan \delta$  value at 60°C

(i.e., smaller rolling resistance) and high  $\tan \delta$  value at 0°C (i.e., larger wet skid resistance and better breaking performance on a wet road), as shown in the results of the Examples of the present application.

The above composition according to the present invention and the advantageous effects obtained therefrom are completely absent in the cited references, as explained below.

U.S. Patent 5,270,394 to Hoxmeier suggests a coupled polymer obtained by contacting the living polymer arms with a fullerene. However, Hoxmeier neither discloses nor teaches the use of the resultant coupled polymer. More specifically, as appreciated by the Examiner, the use of the coupled polymer with carbon black and/or silica is completely absent in U.S. Patent 5,270,394 to Hoxmeier.

In addition, the advantageous effects obtained therefrom, suitable for use as a tire tread when compounded with carbon black and/or silica are not even remotely suggested by Hoxmeier.

U.S. Patent 3,923,722 to Lakshmanan does not overcome the above discussed deficiencies of Hoxmeier with respect to rendering unpatentable the above claims.

Lakshmanan suggests an adhesive composition consisting essentially of a SBR block copolymer, a tackifier, calcium carbonate and a hydrocarbon solvent.

However, Lakshmanan does not teach the use of the composition as a tire tread, but relates to the use of the composition as an adhesive. More specifically, neither the use of the carbon black and/or silica in the composition nor the use of the present modified conjugated diene-based polymer having a fullerene bonded thereto in the specified amount is even remotely taught by Lakshmanan.

Claims 1-3 and 7-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,270,394 to Hoxmeier in view of JP 59-12948 to Nakajima et al. The cited references do not render obvious Claims 1-3 and 7-14.

Nakajima et al. do not overcome the above discussed deficiencies of Hoxmeier with respect to rendering unpatentable the above claims.

Nakajima et al. suggest a sponge rubber comprising a polymer consisting of a solution-polymerized SBR and an ethylene- $\alpha$ -olefin-unconjugated diene copolymer, a furnace carbon black containing, compounded thereto, (A) furnace carbon black, (B) a nitroso-based foaming agent and a urea-based foaming auxiliary, (C) a thiazole-based accelerator and a thiuram-based accelerator.

However, the cited sponge rubber is completely different from the present rubber composition having characteristics suitable for use as a tire tread. The use of the carbon black with the present fullerene-modified conjugated diene-based polymer for the purpose of solving objectives of the present invention is not motivated by JP'948.

Claims 1-3 and 7-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,270,394 to Hoxmeier in view of U.S. Patent 5,750,615 to Lukich et al. The cited references do not render obvious Claims 1-3 and 7-14.

U.S. Patent 5,750,615 to Lukich et al. do not overcome the above discussed deficiencies of Hoxmeier with respect to rendering unpatentable the above claims.

Lukich et al. suggest a rubber composition comprising a diene-based elastomer and a reinforcing filler containing fullerene and carbon black and/or silica.

However, the fullerene used in the cited invention is not bonded to the terminal portion of the conjugated diene-based polymer, unlike the present invention. As mentioned above, according to the present invention, the modified conjugated diene-based polymer is synthesized by reacting growing terminal anions formed by anionic polymerization of the conjugated diene-based polymer with a fullerene. The amount of the fullerene bonded to the terminal end of the modified conjugated diene-based polymer is 0.001 to 2 molecules per one molecular chain of the modified conjugated diene-based polymer.

According to Lukich et al., the fullerene is simply used as a reinforcing agent in the rubber composition in place of at least a portion of carbon black.

Again, there is no motivation to combine Hoxmeier with Lukich et al. for the purpose of solving the problems of the present invention.

Lukich et al. neither disclose nor teach the use of the fullerene-modified diene-based polymer with carbon black and/or silica as recited in the claims as mentioned.

Concerning obviousness, *Graham V. John Deere*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966) outlines the approach that must be taken when determining whether an invention is obvious. In *Graham*, the Court stated that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the art, but emphasized that nonobviousness must be determined in the light of inquiry, not quality. Approached in this light, §103 permits, when followed realistically, a more practical test of patentability. In accordance with *Graham*, four inquiries must be made in determining whether an invention is obvious:

- (1) The scope and content of the prior art are to be determined.
- (2) The difference between the prior art and the claims at issue are to be ascertained.
- (3) The level of ordinary skill in the pertinent art is resolved.
- (4) Evaluating evidence of secondary considerations, such as commercial success, long felt but unsolved needs and failure of others, etc. Also see *KSR Int'l Co. v. Teleflex, Inc.*, No. 04-1350 (U.S. April 30, 2007).

In conjunction with interpreting 35 U.S.C. §103 under *Graham*, the initial burden is on the Examiner to provide some apparent reason or suggestion of the desirability of doing what the inventor did, i.e. the Examiner must establish a *prima facie* case of obviousness. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention, or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. No such reasoning is presented in the present rejections.

Moreover, the cited art lacks the necessary direction or incentive to those of ordinary skill in the art to render a rejection under 35 USC 103 sustainable. The cited art fails to provide the degree of predictability of success of achieving the properties attainable by the present invention needed to sustain a rejection under 35 USC 103. See *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct.

1727; 82 USPQ2d 1385 (2007), *Diversitech Corp. v. Century Steps, Inc.* 7 USPQ2d 1315 (Fed. Cir. 1988), *In re Mercier*, 187 USPQ 774 (CCPA 1975) and *In re Naylor*, 152 USPQ 106 (CCPA 1966).

Also, the properties of the subject matter and improvements which are inherent in the claimed subject matter and disclosed in the specification are to be considered when evaluating the question of obviousness under 35 USC 103. See *Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 USPQ2d. 1923 (Fed. Cir. 1990), *In re Antonie*, 195, USPQ 6 (CCPA 1977), *In re Estes*, 164 USPQ 519 (CCPA 1970), and *In re Papesch*, 137 USPQ 43 (CCPA 1963).

No property can be ignored in determining patentability and comparing the claimed invention to the cited art. Along these lines, see *In re Papesch*, supra, *In re Burt et al*, 148 USPQ 548 (CCPA 1966), *In re Ward*, 141 USPQ 227 (CCPA 1964), and *In re Cescon*, 177 USPQ 264 (CCPA 1973).

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

A two-month extension of time fee is due with this response.

The Commissioner is hereby authorized in this paper to charge payment or credit any overpayment to Deposit Account No. 22-0185, under Order No. 21713-00055-US1 from which the undersigned is authorized to draw.

Dated: February 21, 2008

Respectfully submitted,

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